

Construction Specification

657. Wetland Restoration

1. SCOPE

The work shall consist of furnishing materials and installing all components of the wetland as outlined in this specification and the drawings.

Construction work covered by this specification shall not be performed between December 1st and the following March 15th unless the site condition and/or construction methods to be used have been reviewed and approved by the Engineer.

2. MATERIALS

Unless otherwise set forth in Section 9, the following materials are to be used for construction of a wetland:

PIPE AND FITTINGS shall meet the following requirements, unless otherwise set forth in Section 9:

Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40	ASTM D1785
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Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)	ASTM D2241
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Large Diameter Corrugated Polyethylene Tubing & Fittings	ASTM F667
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Polyethylene (PE) Large Diameter Profile Wall Sewer & Drain Pipe	ASTM F894 or AASHTO-M294
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Type PSP PVC Sewer Pipe & Fittings	ASTM D3033 or D3034
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Water level control structures shall be as shown on the drawings and/or as set forth in Section 9. Other structures require approval by the engineer.

PRECAST CONCRETE UNITS shall

comply with ACI-525 and 533.

3. FOUNDATION PREPARATION

All trees, brush, fences, and rubbish shall be cleared within the areas of the embankment, spillways, appurtenances, and borrow areas. All stumps, roots and rubbish shall be removed from these areas to a depth of at least six inches below the existing ground surface. Unless otherwise set forth in Section 9, all trees, brush, fences, and rubbish shall be cleared from the pool area. All material removed by the clearing and grubbing operation shall be disposed of as directed by the landowner. Topsoil should be stockpiled for use on the embankment and other disturbed areas to facilitate seeding. Final grading of the embankment foundation prior to any fill placement shall remove all unsuitable rock and soil, and any slopes steeper than 1: 1.

For excavated ponds, the pool area shall be excavated to the lines, grades and elevations shown on the drawings. Unless specified in Section 9, the materials excavated from the pond shall be placed in one of the following ways.

- a. Uniformly spread to a height not exceeding three feet with the top graded to a continuous slope away from the pond.
- b. Uniformly placed or shaped, with side slopes assuming the natural angle of repose for the excavated material, and set a distance from the pond edge equal to the depth of the pond, but not less than 12 feet.
- c. Hauled away as directed by the landowner.

4. CUTOFF TRENCH

Where specified, a cutoff trench shall be excavated along or parallel to the centerline of the earthfill, as shown on the plans. Unless otherwise shown on the drawings, the bottom width of the trench shall be governed by the equipment used for excavation, but not less than four feet.

The minimum depth of the cutoff trench shall be three feet or as otherwise shown on the drawings. If large boulders or bedrock is encountered in the excavation, the minimum depth will not be required if, in the opinion of the Engineer, the trench cannot be excavated to the required depth. The bedrock or boulders shall be cleared of all loose materials to insure adequate compaction of backfill material against the rock. The side slopes of the trench shall be 1:1 or flatter, or as otherwise shown on the drawings.

The backfill material for the cutoff trench shall be the same material as the embankment and shall be compacted as set forth in Section 9 for embankment fill. Where rock is encountered, the fill material shall be placed in three-inch layers and compacted by hand or mechanical tampers. Backfilling shall continue in three-inch layers until the depth of fill over the rock is such that acceptable density may be obtained by using construction equipment.

5. PIPES

Excavation for pipes shall be made to the grades and lines shown on the drawings. Pipe shall be placed on undisturbed soil or non-yielding compacted material. Over excavation shall be corrected by replacing and compacting soil to provide a firm and uniform foundation.

If rock or boulders are exposed in the bottom of the excavation, they shall be removed to a minimum depth of eight inches below the bottom of the pipe and, where applicable, below the bottom of anti-seep collars, and replaced with firmly

compacted earth to the specified grade. Pipes shall be firmly and uniformly bedded. Backfill shall be placed so as not to damage the pipe nor disturb alignment in any way.

All pipe joints and connections to structures and antiseep collars shall be watertight. Bell and spigot pipe shall be placed with the bell end upstream.

6. EMBANKMENT

The fill material for the embankment shall be obtained from the designated borrow areas or as specified in Section 9. The material shall be free from stumps, wood, brush, roots, sod, rubbish, and other matter that may decay. It should also be free of stones over two inches in diameter where compacted by hand or mechanical tampers, or over six inches in diameter where compacted by rollers or other driven equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation. Fill material should contain sufficient moisture so that it can be formed into a ball without crumbling. If water can be squeezed out of the ball, it is too wet to compact properly and shall be dried prior to compaction.

Placing and spreading of the fill material shall begin on the lowest part of the foundation and continue in horizontal layers of approximate 6" thick loose lifts or as set forth in Section 9. Materials placed on the fill by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness prior to compaction. Unless otherwise specified the minimum compaction shall be 3 passes of track-type construction equipment.

If openings or sectionalized fills are required, the slope of the bonding surfaces between the embankment in place and the embankment to be placed shall not be steeper than a ratio of 3:1. The bonding surface shall be scarified, plowed, or disked

to a depth of three inches to insure a good bond for the additional new fill.

Fill adjacent to structures, pipe conduits, and drainfill or anti-seep collars shall be placed in a manner adequate to prevent damage to the structure and to allow the structure to gradually and uniformly assume the backfill loads. Heavy equipment shall not be operated within 4' of any structure. Backfill adjacent to structures shall be placed in layers not thicker than four inches prior to compaction with hand or mechanical tampers or as recommended by the structure manufacturer. The height of the backfill shall be increased at approximately the same rate on all sides of the structure during placement.

Subsurface stone drains or pipes found in the cutoff trench and embankment foundation excavation shall be removed to a distance of ten (10') beyond the embankment toe and sealed by compacting to fill the excavation. The seal shall be placed in layers not thicker than four inches prior to compaction with hand or mechanical tampers.

7. EROSION CONTROL AND WATER REMOVAL

All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works.

During the placing and compacting of material in required excavations, the water level at locations being refilled shall be maintained below the bottom of the excavation. Such locations may require draining the water to sumps from which the water shall be pumped to settling basins or vegetated filter areas as approved by the local County Conservation District.

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and Local laws concerning pollution abatement will be followed.

8. SEEDING

A protective cover of vegetation shall be established on all exposed surfaces of the embankment, spillway, and borrow areas to the extent practicable under prevailing soil and climatic conditions. Temporary and permanent seeding, liming, fertilizing and mulching shall conform to the standards for permanent seeding in the Pennsylvania Technical Guide Critical Area Planting (CS-342), and as otherwise set forth in Section 9.

9. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE: